THE UNIVERSITY OF ALBERTA

THE DEVELOPMENT OF SCALES FROM A PUPIL BIOGRAPHICAL

INVENTORY AND THEIR USEFULNESS AS PREDICTORS OF

ACADEMIC ACHIEVEMENT

by

© Adrien W. Tremblay

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1970

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The undersigned certify that they have read, and recommend
to the Faculty of Graduate Studies for acceptance, a thesis entitled
The Development of Scales from a Pupil Biographical Inventory and
their Usefulness as Predictors of Academic Achievement submitted by
Adrien W. Tremblay in partial fulfilment of the requirements for the
degree of Master of Education.

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ABSTRACT

The purpose of the study was to develop scales from a pupil bio-graphical inventory which is the revised Canadian version of the Iowa Pupil Information Blanks and to determine their effectiveness in pre-dicting academic achievement.

The pupil biographical inventory was administered to 576 junior-high school students. These inventories were factor analysed and five factors were extracted.

The students were also administered the 11 stubtests of the Canadian Tests of Basic Skills which served as the achievement criteria. A correlation study was carried out to determine which of the five extracted factors correlated with achievement as measured by the basic skills tests. Two of these factors were found to correlate with achievement. These two factors were identified as an Activities scale and an Educational Aspirations scale.

The students were also administered the verbal and non-verbal tests of the Lorge-Thorndike Intelligence Tests. A step-wise regression analysis was done to determine the effectiveness of the two factor scores in predicting achievement when added to the two ability measures. The two factors were found to add significantly to the predictive power of the Lorge-Thorndike scores in the prediction of 10 out of the 11 criterion variables as measured by the basic skills tests. The two factors accounted for an increase in variance ranging from 1% to 9%. This increase in prediction although statistically significant is fairly low and therefore may limit the practical applicability of the pupil biographical inventory.

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CHAPTER I

INTRODUCTION

STATEMENT AND IMPORTANCE OF THE PROBLEM

Why should we attempt to better predict academic achievement?
If schools are to be committed to instruction taking into account
individual differences and if they are to accept that differential
achievement is an important individual difference, it should then
follow that we need the proper instruments to predict these dif-
ferences in achievement.

While it is well accepted that measures of intellective
ability are the best single-type predictors of academic achievement,
they account for less than half the criterion variation (Lavin, 1965;
Bhatnagar, 1967). This fact has spurred a great amount of research
on the nonintellective factors of academic achievement in recent
years. One approach has been the use of what has generically come
to be known as the biographical inventory or the biographical in-
formation blank.

The underlying assumption of the biographical approach is that
past modes of behavior are reflected in a variety of future perfor-
mances. Freeberg (1967) indicates that this assumption has been
reasonably demonstrated in both the industrial and scholastic settings
which leads him to conclude that research in this area is well worth
the commitment.

Willingham (1965) points out that the biographical information
blank is a relatively immediate source of information, requiring

minimal item construction, is easily revised, and costs relatively little. Owens & Henry (1966) see its main advantage as avoiding the seemingly "devious" items that typify personality tests. Response patterns in biographical information blanks are considered to be very important in providing guidelines for sharpening hypotheses which could lead to more pertinent and penetrating research. (Freeberg, 1967).

In his survey of the research using biographical information blanks, Freeberg (1967) concludes that while there is no contention that scores on these instruments correlate significantly with academic achievement, the theoretical meaning of these results and their predictive utility are still points of contention.

The purpose of this study was to investigate the Pupil Inventory which is the revised-Canadian version of the biographical inventory named the "Iowa Pupil Information Blank". The purpose of this investigation was twofold:

1. Through a factor analysis study, to determine what factors are involved in this particular biographical information blank.

2. Through a multiple-correlation study, to determine the predictive effectiveness of these factors when added to an ability measure.

DEFINITION OF TERMS

Achievement in this study refers to the scores achieved by the student on the eleven subtests of the Canadian Tests of Basic Skills.

Ability refers to the student's obtained scores on the verbal and non-verbal scales of the Lorge-Thorndike Intelligence Tests.

Biographical Information or Biographical Inventories refer to autobiographical and self-reports which usually deal with demographic, experiential and attitudinal variables. The items of these instruments usually deal with factual data, are primarily multiple-choice and lend themselves to conventional analysis and interpretation. These instruments of personal background have customarily been distinguished from personality scales, interest inventories and attitude scales, the content of which usually deals with more homogeneous items and is more often theoretically based.

LIMITATIONS OF THE STUDY

While the sample used in this study was quite substantial (576 Ss), it was restricted to one school and to the junior-high-school level. This restricted sample will therefore demand caution in any extrapolation of the results.

This study also restricted itself to investigating the Iowa Pupil Information Blank. The uniformity of item content and format of this particular instrument with other biographical blanks is questionable and will therefore also restrict the generalization of the results.

CHAPTER II

REVIEW OF RELATED RESEARCH

The prediction of academic achievement has been vastly researched
under two main headings: the intellective factors and the nonintellec-
tive factors. A shift in emphasis from the intellective to the non-
intellective dimensions has been felt in the past decades in order to
account for the greater proportion of the criterion variance which
intellective factors could not account for.

This review will briefly report the findings of the investigations
of the intellective factors, will summarize the research on personality
and environmental factors, and will then look at the research which has
made use of biographical information. The literature reviewed is but
a small fraction of that published; the review limits itself to the
variables which are incorporated in the biographical inventory.

INTELLECTIVE FACTORS

Earlier reviews of predictive studies at the college level report
that college level ability tests correlate about .50 to .55 with grade-
point averages (Cronbach, 1949; Henry, 1950). Lavin (1965) reports
that more recent research also indicates that the correlations average
about .50 with a range of about .30 to .70.

Predictive studies at the high-school level (grades 8 to 12)
found that correlations between intelligence and grades ran between .34
to .80 (Carter, 1959; Cronbach, 1949; Friedhoff, 1955; Gough, 1953;
Jacobs, 1959; Nason, 1958; Travers, 1949). The studies all seem to
indicate that ability and grades, at the high-school level, are cor-
related at about .60 (Lavin, 1965).

In his summary of the research done on the intellective factors as predictors of academic performance, Lavin concludes that at the educational levels for which data are most reliable, i.e. at the high school and college level (data for elementary school students were found to be too scarce for meaningful generalizations), measures of ability on the average account for 35 to 45 per cent of the variation in academic performance. Bhatnagar (1967) in his recent review of this literature comes to the same conclusion.

While it is true that no other single factor accounts for so much of the criterion variance, more than half the variation is not accounted for; thus the pressing need for attending to nonintellective variables.

PERSONALITY FACTORS

In reviewing the research that has been done on personality factors as predictors of academic achievement, Lavin (1965) comes to the conclusion that any attempt at a systematic classification would create a very misleading sense of orderliness in the otherwise disorganized research. He therefore merely lists the variables which have been emphasized by research, the most important being: motivational states (anxiety, achievement motivation, interests), personality style (independence, impulsivity, introversion), adjustment (total, personal and social), and other factors such as habits and attitudes. This review will limit itself to covering the variables which are the most relevant to the present study and to reviewing the most significant studies done on these variables.

Social Adjustment

Among college students, underachievers have stronger interests in social activities than in intellectual activities, while the opposite relationship was found to be true for overachievers (Kerns, 1957; Knaak, 1954). At the high school level, one investigation found that interest in social activities was negatively related to performance (Phelps, 1957).

Most researchers report that underachievers engage in social activities to a greater extent than do overachievers (Bishton, 1957; Kish, 1968; Merril & Murphy, 1959). This has been interpreted to mean that time spent in social acitivity was time lost to study (Durr & Schmatz, 1964; Middleton & Guthrie, 1959; Taylor, 1964); that the gain of social acceptance is an attempt to bolster feelings of inferiority (Kisch, 1968); that underachievers depend to a greater extent on others for their attitudes and values (Burgess, 1956; Chabassol, 1959; McKenzie, 1964) whereas overachievers are more independent and self-sufficient (Bishton, 1958; Gough, 1953; Nash, 1963).

Many investigators have found that although students who achieve well in school engage less in social activities, because their academic commitments allow them less time for social activities (Taylor, 1964), they still have good social adjustment (Bishton, 1957; Cleveland, 1961; Corlis, 1963; Gill & Spilka, 1962; Gowan & Demos, 1966; Nash, 1963) as opposed to underachievers indicating poor social adjustment (Cleveland, 1961; Combs, 1964; Corlis, 1963; Durr & Schmatz, 1964; Carey, 1962; Julitta, 1962; McKenzie, 1964; Nash, 1963; Peppin, 1963; Zoolian, 1965).

Superior social adjustment of achievers is demonstrated by greater awareness of and concern for others and a greater acceptance

of others (Gill & Spilka, 1962; Gowan & Demos, 1966; Nash, 1963; Shaw & Alvin, 1964) as opposed to underachievers who are overly critical of their peers (Carey, 1962; Chabassol, 1959; Combs, 1964) and feel rejected by them (Combs, 1964; Gowan & Demos, 1966; Peppin, 1963). Achievers are also found to have better family relations (Durr & Schmatz, 1964; Easton, 1960; Morrow & Wilson, 1961; Nash, 1963; Peppin, 1963; Zoolian, 1965) and a more positive attitude toward authority figures (Combs, 1964; Gowan & Demos, 1966; Smith, 1965).

Study Habits and Attitudes

Investigations of study habits at the high-school and college levels indicate that study habits are positively related to academic performance whether or not ability is controlled (Bonner, 1957, Burgess, 1956; Carter, 1959; Christensen, 1956; Diener, 1957; Knaak, 1954; Maher, 1959; Schutter, 1956). This is supported by other investigators who found a significant relationship between achievement and study habits (Carter, 1962; Frost, 1965; Martens, 1964). Jex (1959) came to the same conclusion but specified that the time spent in study was not a crucial factor, a finding which is disputed by De Sena (1964) and Finger et. al. (1965).

Several studies have found that positive attitudes towards school, such as the belief in the value of education in general and of intellectual persuit, are positively related to academic performance (Birney, 1959; Demos, 1961; Goldberg, 1963; Kerns, 1957; McGauvran, 1955; Rowlands, 1961; Wellington & Wellington, 1965).

Research on underachievers has found that these students feel that difficulties with study habits are the main obstacles in the attainment

of goals (Frost, 1965; Kerns, 1957); that they rationalize their poor work by proclaiming lack of interest and lack of effort (Centi, 1963); and that they are unwilling to conform to academic requirements (Demos, 1961; Goldberg, 1963; Rowlands, 1961; Wellington & Wellington, 1965).

Achievers, on the other hand, are found to like their classes and instructors and spend more time doing optional reading (Gerberich, 1949); are found to have parents who tend to be more interested in education (Mackler & Giddings, 1965); and devote more time to study, preferring quiet and studying by themselves (Joshi & Chaudhair, 1967).

An instrument frequently used for the assessment of both study habits and study attitudes is the Survey of Study Habits and Attitudes (Brown and Holtzman, 1955). These investigators found, from a population of both males and females from 10 colleges, the correlation of the scores from this instrument with college grades to be .40 and a multiple correlation of .70 when the inventory was combined with an ability measure in the prediction. Investigations of the Brown-Holtzman instrument and similar ones (Chahbazi, 1958) indicate that inventories combining attitudes and habits are useful in prediction but do not establish the superiority of one or the other type of item (Chahbazi, 1958; Holtzman, 1954; Lum, 1960; Sie, 1955). On the other hand, some investigators have found no gain in prediction from these inventories when combined with ability measures (Ahmann, 1958; Anderson, 1959).

Are attitudes toward study more powerful predictors of achievement than study habits? It would seem so from the research evidence. Lum (1960) concluded that attitudes are more important than the mechanics of study when she found no difference in study habits between achievers and underachievers but found differences in attitude. Brown and Holtzman

(1955) suggest that the attitude and effort that one brings to the study situation may be more important than how one studies. De Sena (1964) concluded that the main differences between successful and failing students may be their attitude and motivation toward the task of studying and should not be attributed to study skills alone. Finger and Schlesser (1965) arrive at a similar conclusion when suggesting that the most significant factors in academic success are attitude, behavior and self-concept as related to school.

Achievement Motivation

Achievement motivation is a concept which refers to an individual's need for a high standard of performance in a given task (Lavin, 1965). This concept has been investigated in two general ways: by pencil-and-paper questionnaires such as the Edwards Personal Preference Schedule and by projective techniques such as the Thematic Apperception Test.

The results of investigations using projective techniques have been found to be very inconsistent. Some studies have found a positive relationship between projective measures of achievement motivation and academic performance (Burgess, 1956; Chahbazi, 1956; McClelland, 1953; Rosen, 1956; Weiss, 1959) while other investigators have found no relationship between these two measures (Haber, 1957; Hills, 1958; Krumboltz, 1957; Mitchell, 1961; Parrish, 1954; Walter, 1957). These inconsistencies are felt to be partly attributed to the low reliability of projective measures, the TAT in particular (Krumboltz, 1957 a & b).

Questionnaire methods, on the other hand, have been found to yield much more consistent results. Investigators at both the high-school and college levels have found low but positive relationships

between performance and achievement motivation as measured by either the need for achievement scale from the Edwards Personal Preference Schedule (Bendig, 1958; Christensen, 1959; Hills, 1958; Krug, 1961; Weiss, et. al., 1959) or measures of the level of aspriation (Bresee, 1957; Christensen, 1959). On the basis of these findings, questionnaire methods seem to be much more useful than projective techniques in the prediction of academic achievement.

Many investigators of factors which have been termed "interest" measures could well be indexed as social aspirations or mobility measures and are likely tapping motivational factors. For this reason, measures of interest are intergrated into this achievement motivation survey. It has been found that overachievers at the college level tend to have higher interest scores on high prestige occupations (Rust & Ryan, 1954), that the level of interest as measured by the Strong has a positive relationship to grades (Cronbach, 1949) and that the more certain and definite a student's vocational or educational goals, the higher he is likely to perform (Bloomberg, 1955; Weitz, et. al., 1955). At the high-school level, underachievers were found to differ from achievers in that they more often chose goals which had been set by others and which were found not to be in line with their personal interests as measured by standard tests (Armstrong, 1955).

It is also difficult to differentiate between attitudes and motivation. This is well brought out by Kurmboltz (1957), who concluded his study by stating that while no single instrument can measure academic motivation, the most effective are probably inventories such as the Survey of Study Habits and Attitudes.

The literature describes underachievers as characterized by low attention span and concentration, and in spite of well developed vocabulary and conceptual thinking, are weak in areas which depend on motivation to do well, especially tasks requiring the acquisition of specific skills (Atkinson, 1968; Dudek & Lester, 1968). They are found to have difficulties with subordinating personal needs to demands for study and work (Kish, 1968) and lack discipline as manifested by the inability to complete tasks which are not entirely pleasant to them (Miller, 1962). Haywood (1968) has found that overachievers tend to be motivated by factors inherent in the performance of the task while underachievers tend to be motivated by factors extrinsic to the task (ease, pleasure, safety, or comfort of doing the task). Haywood concludes that studying may well be considered repuguant to the underachiever since it does not tend to be easy, pleasurable or comforting. De Sena (1964) concludes that one's attitude and motivation toward scholastic activities are more important determiners than knowledge of good study habits and skills, a conclusion which is shared by Finger & Schlesser, (1965).

ENVIRONMENTAL FACTORS

The nonintellective approach to academic achievement has not limited its research to personality factors but has also extended its investigations to environmental or sociological determinants. Much research has been done on demographic variables such as socioeconomic status, sex, religion, culture, regional variation, and age; on specific role relationships such as student-student and student-teacher; and on family relationships. The content of this review will be limited to looking at the research done on socioeconomic status and family relationships as correlates of achievement.

Socioeconomic Status

Most investigations of SES measure by some objective technique on
variables such as occupation, education and income of the supporting
member(s) of the family which give an index of the relative position of
the student's family on a status scale. The research has found that
SES is usually positively related to academic performance at all levels
of education and especially at the secondary school level (Bresee, 1957;
Coster, 1959; Gibboney, 1959; Hoehn, 1967; Knief, 1958; Kornrich, 1965;
Tyszkowa, 1968).

SES is considered an important variable because it symbolizes or
summarizes a number of important correlates of achievement such as
attitudes, values, and motivations toward academic performance. The
positive relationship between SES and measures of intelligence has been
extensively documented (Crowley, 1959; Friedhoff, 1955; Knief, 1959;
Miner, 1957; Mitchell, 1956; Noll, 1960; Pinneau, 1958), but the degree
of independence between these two factors in relation to academic per-
formance still demands much research. Some investigators have found
that the relationship between SES and achievement was not totally neutra-
lized when ability was controlled, which led them to conclude that SES
would appear to summarize other factors than the intellectual one
(Friedhoff, 1955; Knief, 1959).

A positive relationship between SES and achievement motivation
has also been well documented. Students from higher status levels tend
to exhibit higher levels of motivation towards academic performance,
have higher educational aspirations (Rosen, 1956), and believe in the
value of delayed gratification (Schneider & Lysgaard, 1953) and planning
for the future (Brim, 1956). Other studies have demonstrated the direct

relationship of SES with values and attitudes toward education (Grim
& Forer, 1956; Brown & Dubois, 1964; Mackler & Giddings, 1965; Rosen,
1956; Schneider & Lysgaard, 1953; Sewell & Shah, 1968) and with educa-
tional and occupational aspirations (Crandall et. al., 1964; Crowley
& Hyman, 1953; Freeberg, 1967; Sewell, 1957; Wilson, 1959; Winterbottom,
1958).

Factors pertaining to environmental conditions are being established
successfully by the use of biographical inventories (Brown & Dubois,
1964; Carter & McGinnis, 1953; Ford, 1957; Malloy, 1954; McQuary, 1954).
These instruments will be surveyed extensively in the next section.

Family Relationships

Investigators have documented the inverse relationship between
family size and academic performance, explaining this relationship
by finding that family size was also inversely related to intelligence
and SES (Bernstein, 1958; Hunt, 1961; Nisbet, 1961). This relation-
ship seems to hold, except for occupational levels which are at the
very top (Hunt, 1961) and for only children who were found to perform
significantly lower than a control group matched for ability (Weitz &
Wilkinson, 1954). Research on underachievers found that these students
tended to come from culturally disadvantaged homes characterized by low
income, poor housing, a large number of children, and working mothers
(Hoehn, 1964; Kornrich, 1965; Tyszkowa, 1968).

The education of parents appears to be a very important factor in
predicting academic achievement. Parents of underachievers tend to
have less education and to value education less than parents of over-
achievers who tend to value education positively (Brown & Dubois, 1964;
Mackler & Giddings, 1965; Sewell & Shah, 1968). Parents of achievers

are found to be more interested in and demanding of scholastic achieve-
ment (Crandall et. al., 1964; Freeberg, 1967; Winterbottom, 1958) than
parents of underachievers, and they are more often described by their
children as interested and understanding (Tibbets, 1955).

Family interactions are also isolated as important predictors of
academic achievement. Chabassol (1959) found a negative relationship
between disrupted family lives and academic performance. The under-
achiever is described as feeling rejected by his parents and the family
interaction is found to be superficial and distant (Chabassol, 1959;
Combs, 1965; Gowan and Demos, 1966; Zoolian, 1965) as opposed to the
achiever who is found to come from a more stable family life and is
described as having better family relations (Durr & Schmatz, 1964;
Nash, 1963; Peppin, 1963; Zoolian, 1965).

BIOGRAPHICAL INFORMATION

Prior to the 1960's, biographical questionnaires for the prediction
of academic achievement were used only sporadically (Asher & Gray, 1940;
Bittner, 1945; Carter & McGinnis, 1953; Ford, 1957; Lief, 1940; Malloy,
1954; Scott, 1938). Malloy and Ivanoff (1964), in their attempt at
constructing a biographical instrument, noted that less than two years
earlier, such data had seldom been utilized and only lately had the
approach been commanding a fair degree of activity in the field of
research on achievement.

The growing interest in the use of nonintellective variables has
helped spur the use of what has generically come to be known as the
biographical inventory or the biographical information blank as an
instrument for the systematic research of academic achievement (Freeberg,

1967). This instrument of personal background has customarily been distinguished from personality scales, interest inventories and attitude scales, the content of which usually deals with more homogeneous items and is more often theoretically based (Fishman & Pasanella, 1960; Lavin, 1965). Although this distinction is legitimate, it should not be taken as definitive; many items which appear in what is designated as a biographical information blank often appear in varying formats but with similar content in other measures of nonintellective variables (Freeberg, 1967).

The characteristic features of the biographical information blank have been defined by Owens and Henry (1966) as an autobiographical and self-report which usually deals with demographic, experiential and attitudinal variables. The items usually deal with factual data, are primarily multiple-choice and lend themselves to conventional analysis and interpretation.

Biographical information blanks have been used in the prediction of four criterion areas of student life: scholastic grades, creative (nonclassroom) achievement, persistence in school, and vocational or curriculum choice (Freeberg, 1967). For the purposes of this study, the use of biographical information in the prediction of academic achievement will be the only criterion reviewed.

Research studies using biographical data have either been concerned with the characteristics of a particular biographical information blank, e.g. the "Life Experience Questionnaire" (Malloy, 1955); the "Project Talent Student Information Blank" (Shaycoft et. al. 1963): the "Background and Experience Questionnaire" (Maier & Anderson, 1964); the "Personal Background Inventory" (Watson, 1965); the "Personal Data Inventory" (Denham, 1966), or with the effectiveness of adding background informa-

tion to a larger battery of personality and ability measures in the prediction of academic achievement.

Fishman and Pasanella (1960) having surveyed the results of 23 studies using biographical information predictors with achievement criteria reported correlations ranging from .01 to .63 with a median of .13. Many other studies have reported significant correlation coefficients between biographical information and academic performance (Aiken, 1964; Anastasi et. al., 1960; Cline et. al., 1963; Denham, 1966; Engle, 1967; Starks, 1968). That biographical information scores are significant correlates of academic achievement has therefore been substantially documented.

Freeberg (1967), in his survey of the research, concludes that while there is no contention that scores on biographical information blanks correlate significantly with academic achievement, the theoretical meaning of these results and their predictive utility are still points of contention.

Many studies have found that biographical information scores add very little to a multiple R along with measures of ability (Asher & Gray, 1940; Hilton & Myers, 1967; Lief, 1940; Myers, 1952; Myers & Schultz, 1950; Schultz & Green, 1953; Scott, 1938; Webb, 1960). On the other hand, some research does indicate reasonably substantial increases in prediction when biographical information is added to ability measures (Denham, 1966; Malloy, 1955; Malloy and Ivanoff, 1964; Starks, 1968).

Controversial results have also been found in studies attempting to predict achievement with ability held constant: Watson (1965) reports a virtual loss of predictive efficiency of biographical information

scores while Genitz (1955) and Weitz et. al. (1957) found that bio-
graphical information scores differentiated their groups with ability
held constant. Freeberg (1967) concludes that these inconsistent
results should not be surprising when one considers the lack of
consistency as to the items which constitute a biographical informa-
tion blank, the selctivity and variability in samples and the lack
of a well defined theoretical framework.

Unique types of biographical inforamtion blanks which limit their
item content to study habits and attitudes toward school work are found
to be consistently good predictors of academic achievement. Fishman
and Pasanella (1960) in their review of the literature reported a
median R of .47 for investigations using this type of blank. Compared
to other biographical information blanks and other non-intellective
measures, the study habits and attitude blanks are found to be the
best predictors of grade-dependent criteria (Brown & Dubois, 1964;
De Sena, 1964 a, 1964 b).

CRITIQUE OF ACHIEVEMENT RESEARCH

The field of achievement research is characterized by a vast number
of experimental variables, deals with all academic levels in an unsyste-
matic fashion, makes use of a wide variation of experimental design and
consequently yields inconsistent, conflicting and disorganzied results
(Lavin, 1965; Peterson, 1963; Rust, 1958). The general procedure of
these studies has been the single-factor-correlation type whereby scores
from a psychometric test or various subtests have been correlated with
a performance criterion. It appears that these simple research designs
have not been very fruitful in the quest for a comprehensive picture
of the correlates of achievement.

Perhaps one of the main reasons for the diversity of research

findings, aside from the lack of standardization of criterion variables (Lavin, 1965; Paterson, 1963), can be found in the very nature of the research designs which have tended to be univariate and unidimensional, thereby failing to control for variables within and without their dimension of study. The bulk of research has been done on three main dimensions, i.e. the intellective factors, the personality factors and the sociological or environmental factors. Many studies of personality factors for instance have failed to control for either the intellective or environmental factors or both (Lavin, 1965); they have thus failed to control for variables without their dimension. Interest studies are an instance of lack of control for variables within a dimension: interest measures may not be independent of measures of social aspiration yet few of these studies ever control for this factor (Lavin, 1965). When one considers their lack of comprehensiveness and adds the fact that many significant factors of achievement are not generalizable from one academic level to the other, the state of this field of research should not surprise us.

Techniques which have been used more often and more successfully in recent years have been the multivariate factor and cluster analysis (Helm, 1967; Kisch, 1968; Loevinger, 1957; Precht, 1968) which attempt to extract orthogonal factors or homogeneous clusters of items from a series of variable measurements. These methods permit the control of the dependence or independence of a large number of variables and therefore provide a very valuable tool to remedy the lack of comprehensiveness of research on achievement.

With regards to the use of biographical information blanks,

Freeberg (1967) finds that the potential advantages of these instruments have been obscured by research which has been too specific, samples which have been too small and restricted for any meaningful generalization and questionnaires which have lacked uniformity in item content, in format, in scoring procedures and in predictive criteria. Research methodology using biographical information seems therefore to be plagued by the same lack of standardization which characterizes the whole field of research on achievement.

Freeberg also isolates three variables which are special to to biographical information blank and which he feels should be investigated. These are the stability in factor structure, in item responses and in item validity over time; age norms for age dependent items; and the temporal relationship between the collection of predictor and criterion measures. Freeberg's (1967) conclusion is:

> "Without attention to such research considerations, development of biographical measures for use with students will rapidly find itself approaching the "prediction pattern" and corresponding lack of understanding that marks Henry's (1966) concern about the future of the BIB."

CHAPTER III

RESEARCH DESIGN

THE SAMPLE

The sample under investigation in this study was comprised of the students of Hillcrest Junior High School in Edmonton. The number of subjects in the sample varied from one part of the study to the other. For instance 576 students were administered the Pupil Inventory and therefore 576 Ss was the size of sample for the factor analysis study. As for the correlation studies which followed, the size of sample depended on the number of Ss having completed the appropriate tests. These sample sizes will be given in the following chapters.

THE INSTRUMENTS

Three different instruments were needed in the collection of data for this study:

(1) A biographical inventory for the collection of biographical information; the Pupil Inventory was used in this regard.

(2) A basic skills test for the collection of achievement data; the Canadian Tests of Basic Skills was chosen.

(3) An intelligence test for the collection of intellective ability data; the Lorge-Thorndike Intelligence Tests were used for this purpose.

The Pupil Inventory

The Pupil Inventory is the revised-Canadian version of the biographical inventory named the Iowa Pupil Information Blank. This instrument was constructed at the University of Iowa with the purpose of collecting background information on students in the public schools. Very

minor changes had to be made to make this blank applicable to the Canadian situation.

The inventory, a copy of which can be found in Appendix A, consists of 30 questions and 132 possible responses. The content covered by this questionnaire can be summarized as follows:

(1) Family background data (7 questions) covering marital status, employment of parents, educational status of parents, parental attitude and health.

(2) Activities data (11 questions) covering extra-curricular activities such as work, interests, hobbies, responsibilities, socialization, etc.

(3) Attitudes data (5 questions) covering peer relationships, studying, homework, specific subjects, etc.

(4) Expectations data (7 questions) covering expectations of grades, teacher expectations, vocational aspirations, etc.

The Canadian Tests of Basic Skills

This instrument is the revised-Canadian version of the Iowa Every-Pupil Tests of Basic Skills, the construction of which has been carried out at the University of Iowa for over thirty-five years and which has been edited fourteen times.

The purpose of the Canadian tests is to provide information on the growth of pupils in such basic areas as vocabulary, reading, writing, and mathematics and as such is related to the total educational progress of the student. This test battery is made up of 11 sub-tests (Teacher's Manual 1967). The figures in parentheses indicate the amount of time alloted for each subtest.

Test V: VOCABULARLY (17 minutes)

Test R: READING COMPREHENSION (55 minutes)

Test L: LANGUAGE SKILLS (67 minutes)

        L-1:   Spelling (12 minutes)
        L-2:   Capitalization (15 minutes)
        L-3:   Punctuation (20 minutes)
        L-4:   Usage (20 minutes)

Test W: WORK-STUDY SKILLS (80 minutes)

        W-1:   Map Reading (30 minutes)
        W-2:   Reading Graphs and Tables
             (20 minutes)
        W-3:   Knowledge and Use of Reference
             Materials (30 minutes)

Test M: MATHEMATICS SKILLS (60 minutes)

        M-1:   Mathematics Concepts (30 minutes)
        M-2:   Mathematics Problem Solving
             (30 minutes)

The validity and reliability of the Iowa version of these tests have been extensively documented and these tests are generally regarded as some of the best in the field (Buros, 1959). These tests are also extensively used in research. The Canadian tests have not as yet, been to our knowledge, reviewed but for the purposes of study were regarded as reliable as their Iowa counterparts having been constructed from them. What was needed for this study was a standardized achievement test to measure a criterion to be predicted and the Canadian Tests of Basic Skills met this need very adequately.

The Lorge-Thorndike Intelligence Tests

This well known instrument is generally regarded as the best pencil and paper intelligence test and is highly correlated with achievement tests (Buros, 1959; Manula, 1962). The Edmonton Public School System is presently using this instrument in its testing pro-gram. Suffice it to say that this instrument yields verbal and non-

verbal scores both of which were used in this study.

ADMINISTRATION AND SCORING

All tests were administered to the students of Hillcrest by their teachers under the supervision of a school counsellor of the Edmonton Public School System. The testing was done in the fall of 1968.

The scoring of the basic skills tests and intelligence tests was done by the Educational Research Services, University of Alberta, under the supervision of Dr. J. Bicknell. A scoring procedure had to be devised for the biographical inventory. The procedure utilized was to treat the 132 possible responses as variables, to rank order the response groups (grouped by question) which consisted of rank order data, and to treat the other response groups as nominal data. All responses not selected were given a score of 0. The selected responses were then given a score of 1 if part of a nominal-data group or their rank score if part of an ordinal-data group.

STATISTICAL ANALYSIS

The statistical analysis of the data consisted of the three following steps:

(1) A factor analysis study to extract whatever factors were involved in the Pupil Inventory;

(2) A correlation study to determine which of the extracted factors correlated with achievement as measured by the Canadian Tests of Basic Skills;

(3) A step-wise regression study to determine the predictive effectiveness of the correlated factors in predicting achieve-

ment.

Factor Analysis Study

A principal components factor analysis using the Varimax ortho-gonal rotation was used to factor analyse the 132 variables of the Pupil Inventory on 30 factors. It was planned to make several runs eliminating variables with no factorial weight and also diminishing the number of factors.

Correlation Study

Once the factors extracted, factor scores were developed for each S on these factors. Factor scores and achievement scores (i.e. scores on the basic skills tests) were then subjected to a linear regression analysis.

Step-Wise Regression Study

The verbal and non-verbal scores from the Lorge-Thorndike Intel-ligence Tests were used in prediction equations to predict each of the 11 achievement subscores obtained from the test of basic skills. Each of the two factor scores were added to each of the regression systems and new equations were calculated. The predictive value of the factor scores were then calculated by testing the significance of the increase in the multiple R^2 obtained from the regression system which included the biographical factors over that which included only the intelligence test scores.

CHAPTER IV

RESULTS OF ANALYSIS OF DATA

INTRODUCTION

As mentioned in the previous chapter on research design, the
statistical analysis of data consisted of three steps: a factor
analysis study to extract factors from the Pupil Inventory, a cor-
relation study to determine the correlation of the extracted factors
with achievement, and finally a step-wise regression study to determine
the effectiveness of the correlated factors in predicting achievement.
The results of the analysis are presented in the manner outlined by
the design.

FACTOR ANALYSIS STUDY

The variables constituting the Pupil Inventory were factor
analysed three times.

First Run

From the 132 variables of the Pupil Inventory, the first factor
analysis study extracted 30 factors. The eigenvalues for the first 25
factors were plotted (Figure 1) and a curve was drawn. A discontinuity
in the curve can be observed between the 6th and 7th factors. On the
basis of this break in the curve, the first 6 factors were retained for
further analysis and the remaining factors were dropped.

On the basis of the first analysis, two variables were found to
have zero weight on all factors. After a frequency count, these variables
were found to have zero frequency and were therefore dropped.

Figure 1. EIGENVALUES OF THE FIRST 25 FACTORS FROM THE 132 VARIABLES OF THE BIOGRAPHICAL INFORMATION BLANK.
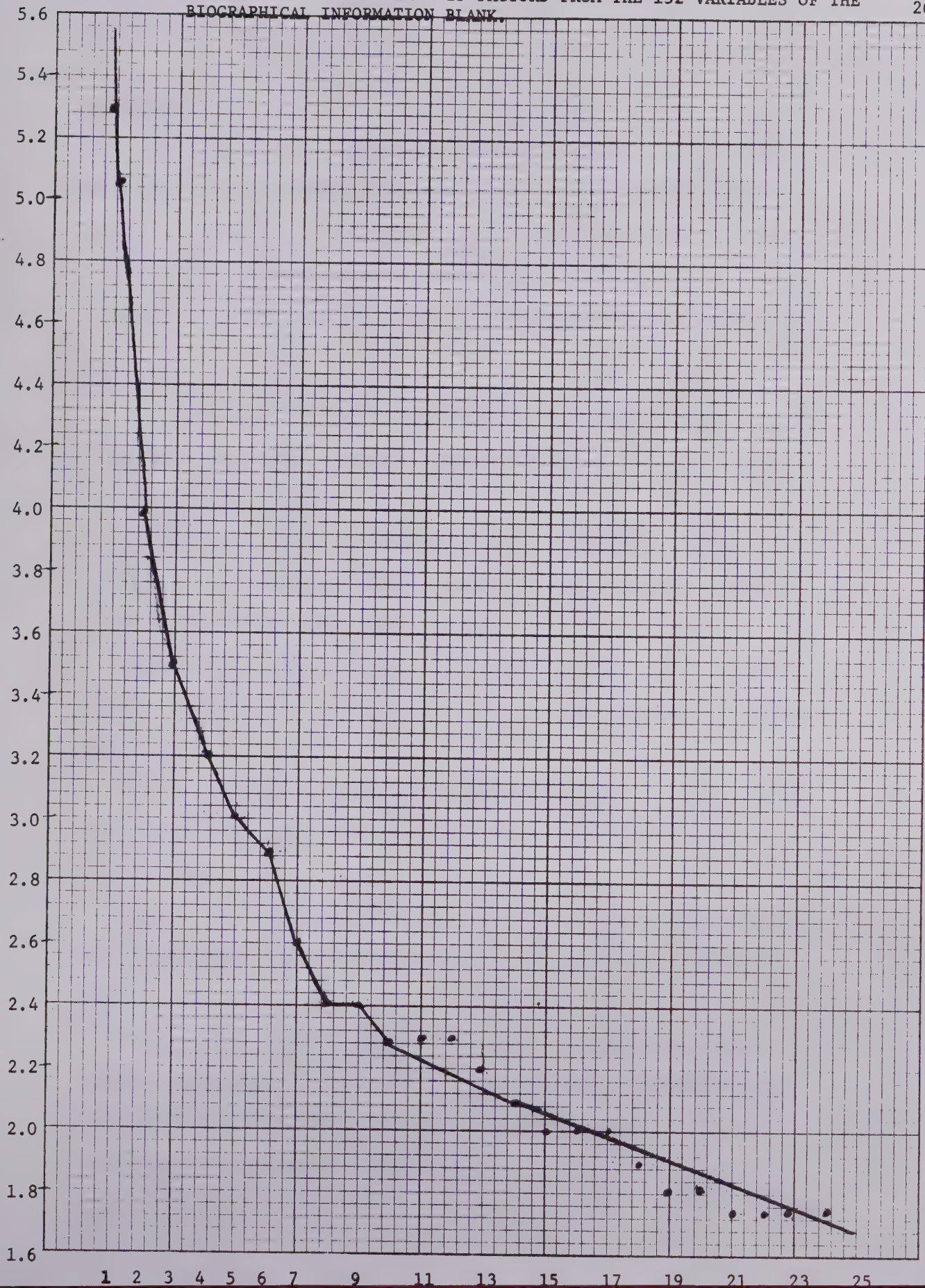
Second Run

The remaining 130 variables were factor analysed. Six factors were extracted. At this point it was decided to eliminate all variables not having at least a factorial weight of .2 on any one of the 6 factors.

57 variables were found not loading on any factor at the .2 level. These variables were dropped leaving 73 variables meeting the criterion.

Third Run

The remaining 73 variables were factor analysed once more on the 6 factors. The factor loadings of these variables on the 6 factors can be found in Table 1.

Factor 1 was found to be constituted of 14 variables meeting the .2 level. It was identified as a family background scale and retained as an important scale for further study.

Factor 2 was constituted of 12 variables meeting the .2 criterion and was identified as an activities scale. It was retained for further study.

Factor 3 has 26 variables meeting the criterion. It was identified as an educational and vocational aspirations scale and retained for further study.

Factor 4 was constituted of 18 variables and was identified as a family background and attitudes scale. It was retained for further study.

Factor 5 was constituted of 9 variables. Its content seemed situated in the same area as factor 3 (aspirations) and therefore it was decided to combine these two factors under the label of Factor 5 and retain this factor for further study.

TABLE 1

VARIMAX ROTATED FACTOR MATRIX

Variable	Factor					
(Measure)	1	2	3	4	5	6
1	-.960	.034	.044	.002	.083	-.065
2	.422	-.111	.000	-.289	-.297	.008
3	.452	.043	.029	.084	.099	.021
4	.353	.110	-.071	.167	.025	-.032
5	.569	-.059	-.050	.047	.016	.008
6	.058	-.101	.098	-.019	.031	.699
7	-.954	.034	.058	.007	.079	-.060
8	.726	.048	-.037	.243	.081	-.023
9	.325	-.088	.022	-.241	-.339	.001
10	.312	.058	-.053	-.073	.035	-.004
11	.310	-.094	.019	-.122	-.072	-.058
12	.058	-.101	.098	-.019	.031	.699
13	.114	-.002	-.122	-.149	-.052	.076
14	.471	-.043	-.094	.030	.230	-.009
15	-.075	.039	-.025	.025	-.263	-.016
16	-.072	.011	.119	-.206	.084	.217
17	-.138	.063	.234	.040	.049	-.074
18	.276	-.020	-.043	.211	.151	.021
19	-.157	-.038	-.157	-.798	.003	-.101
20	-.029	-.059	.033	.484	-.040	-.013
21	.036	-.051	.162	.043	-.006	.376
22	-.069	.087	.220	.325	-.107	-.010
23	-.192	.080	-.007	-.768	.100	-.118
24	-.083	-.021	-.002	.300	.014	-.134
25	-.025	.057	.068	.456	-.027	.027
26	.111	-.026	.018	.388	-.068	.124
27	.319	-.158	-.070	-.026	-.088	.232
28	-.148	.120	.214	.086	-.159	-.130
29	.002	.040	.022	-.206	-.197	.222
30	-.021	-.056	-.035	.230	.175	-.225
31	-.059	.045	.287	.016	-.048	-.006
32	-.066	.550	.177	-.025	-.016	.012
33	-.001	.537	.137	-.027	.055	-.161
34	-.078	.461	.101	.005	.056	.014
35	-.013	.573	-.006	-.033	-.013	-.034
36	.012	.594	.006	-.008	-.011	-.019
37	.016	.595	-.093	.076	-.039	-.015
38	.071	.600	-.123	-.035	-.068	.009
39	.000	.663	.030	.004	.042	-.049
40	-.025	.608	.018	.055	-.070	-.017
41	-.004	.612	-.043	.001	.018	-.058
42	-.038	-.009	.339	-.067	-.040	-.025
43	-.039	.182	.529	-.054	-.080	-.113
44	-.032	.195	.672	-.098	-.054	-.026

TABLE 1 (continued)

Variable	Factor					
(Measure)	1	2	3	4	5	6
45	.090	-.161	-.182	.170	.194	-.132
46	.010	-.265	-.337	.026	.132	-.197
47	.020	.132	-.349	-.110	.004	-.003
48	.036	-.016	-112	.241	.098	.187
49	-.064	.066	-.364	-.037	.091	-.050
50	-.132	.052	-.151	.038	-.019	.601
51	.009	-.023	.249	.086	-.812	-.142
52	.033	.099	.619	-.169	.613	-.074
53	.072	-.127	-.189	.169	.200	-.156
54	.043	-.247	-.301	-.012	.158	-.199
55	.026	.123	-.368	-.060	.049	-.011
56	.025	-.063	-.088	.244	.122	.116
57	-.106	.092	-.336	-.049	.059	-.039
58	-.097	.035	-.178	.060	-.005	.622
59	.021	-.041	.261	.103	-.813	-.152
60	-.003	.084	.604	-.174	.612	-.073
61	-.224	.008	.229	-.053	-.075	-.009
62	.040	-.028	-.223	-.109	-.058	-.081
63	-.010	-.068	-.025	-.252	.050	.087
64	-.034	.079	.070	.200	-.030	-.286
65	.058	-.015	-.049	.003	.001	.301
66	.022	-.045	.320	.021	.096	-.070
67	.039	.019	-.371	-.044	.016	.092
68	.038	-.014	-.248	-.019	-.058	-.050
69	.065	.054	.243	-.085	.093	-.016
70	.070	.056	.294	.024	-.190	-.023
71	-.015	-.022	.006	.121	.081	.319
72	.133	-.051	-.238	-.047	.125	-.055
73	.087	-.191	-.338	.045	.185	-.195

| Percent of Common Variance | 20.6% | 19.0% | 18.3% | 14.3% | 14.2% | 13.6% |

Factor 6 was constituted of 12 variables half of which measured the same areas as factors 1 and 4 and the content of the other half was not possible to indentify. This factor was dropped from further study.

CORRELATION STUDY

Before beginning the correlation study, five factor scores were caluculated for each of the pupils in the sample. The method used was as follows: each variable meeting the .2 criterion was given a weight of + or - 1 depending on its sign in the factor matrix. Scores were then devised by multiplying the factor weight (+ or - 1) by the coded score given the variable when scoring the biographical information blank (see research design). Factor scores were derived by summing over all variables contributing to the factor.

Inter-correlations among the five factors scores were obtained and each of the five factor scores were correlated with each of the 11 achievement scores obtained from the basic skills tests. These coefficients can be found in Table 2.

Are these factors correlated with achievement as measured by the basic skills tests? According to the critical values of the correlation coefficient as computed by Fisher and Yates, the critical value of r for 100 df at the .05 level of confidence for a one-tailed test is .164. The degrees of freedom for the three respective grades were as follows: 177-196 in grade 7, 110-134 in grade 8 and 188-234 in grade 9. This variation was due to a number of students completing certain achievemnt tests but not all. As all samples were of well over 100 df, the cut-off criterion for the evaluation of these correlation coefficients was decided to be .15.

TABLE 2

CORRELATION COEFFICIENTS OF THE FIVE

FACTOR SCORES CORRELATED WITH ONE

ANOTHER AND WITH EACH OF THE 11 CRITERION SCORES

	Factor 1 Grade			Factor 2 Grade			Factor 3 Grade			Factor 4 Grade			Factor 5 Grade		
Factor	7	8	9	7	8	9	7	8	9	7	8	9	7	8	9
1	1.00	1.00	1.00												
2	−.16	−.06	−.09	1.00	1.00	1.00									
3	−.17	−.29	−.22	.26	.36	.14	1.00	1.00	1.00						
4	.19	.28	.15	−.02	.00	−.02	.06	−.10	.13	1.00	1.00	1.00			
5	−.17	−.28	−.20	.28	.34	.15	.92	.93	.92	.05	−.09	.13	1.00	1.00	1.00
Criterion															
1	−.06	−.08	.01	−.08	.25	.14	.25	.48	.42	.06	−.11	.01	.26	.42	.37
2	−.04	−.08	−.05	.19	.31	.11	.48	.47	.49	−.04	−.13	.01	.42	.43	.39
3	−.12	.05	−.11	.15	.23	.07	.39	.33	.31	−.05	−.04	−.13	.30	.24	.26
4	−.04	.03	−.02	.21	.24	.17	.33	.31	.35	−.06	.00	−.04	.26	.25	.30
5	−.07	.11	−.10	.15	.19	.15	.45	.33	.34	−.02	−.08	−.08	.36	.26	.27
6	−.05	.04	−.15	.21	.20	.10	.37	.40	.21	−.02	−.02	−.04	.33	.33	.17
7	−.03	−.12	−.14	.09	.37	.28	.36	.48	.32	−.10	−.15	.09	.35	.48	.32
8	−.16	−.05	−.13	.24	.26	.14	.38	.43	.36	−.03	−.14	.01	.37	.39	.35
9	−.13	−.12	−.13	.23	.28	.11	.44	.47	.29	−.11	−.15	−.05	.39	.40	.25
10	−.08	−.03	−.13	.15	.36	.19	.43	.44	.38	−.06	−.11	−.07	.41	.45	.31
11	−.16	.01	−.11	.11	.16	.16	.31	.37	.25	−.13	−.07	.13	.26	.40	.24

Factor 1 was found to be correlated with two achievement variables in grade 7,none of the achievement variables in grade 8, and only one achievement variable in grade 9. It was consequently rejected as an important factor in the prediction of our 11 achievement variables.

Factor 2 was found to be correlated with all 11 achievement variables in grade 7, all 11 in grade 8, and all 11 in grade 9. It was retained as an important factor.

Factor 3 correlated with all 11 achievement variables in grade 7, all 11 in grade 8, and all 11 in grade 9. It was retained as an important factor.

Factor 4 was found to be correlated with none of the achievement variables in grade 7, 2 variables in grade 8, and none of the achievement variables in grade 9. It was rejected as an important factor.

Factor 5 was found to be correlated with all 11 variables in grade 7, all 11 in grade 8, and all 11 in grade 9. As stated earlier, factor 5 was a combination of factors 3 & 5. Factor 5 was correlated .92 in grade 7, .93 in grade 8, and .92 in grade 9 with factor 3 and in no case did factor 5 have a greater correlation coefficient with achievement than factor 3. For these reasons, factor 5 seemed for the most part to be made up of factor 3 and was therefore rejected as an important factor in the prediction of achievement.

There remained two factors that were correlated with achievement as measured by the Basic Skills tests: factor 2 and factor 3. Table 3 shows the item content and factorial weight of variables constituting factor 2. From the item content, factor 2 can be identified as an activities scale. Table 4 shows the item content

TABLE 3

ITEM CONTENT AND FACTORIAL

WEIGHT OF VARIABLES CONSTITUTING

FACTOR 2

Variable	Factor 2
32 Extracurricular Activities	.550
33 Extracurricular Activities	.537
34 Extracurricular Activities	.461
35 Extracurricular Activities	.573
36 Extracurricular Activities	.594
37 Extracurricular Activities	.595
38 Extracurricular Activities	.600
39 Extracurricular Activities	.663
40 Extracurricular Activities	.608
41 Extracurricular Activities	.612
46 Highest level of education aspired to: High School	-.265
54 Highest level of education aspired to: High School	-.247

and factorial weight of variables constituting factor 3. From the

item content, factor 3 can be identified as an aspirations scale.

TABLE 4

ITEM CONTENT AND FACTORIAL

WEIGHT OF VARIABLES CONSTITUTING

FACTOR 3

Variable	Factor 3
17 Father's occupation	.234
22 Mother's occupation	.220
28 Mother's education	.214
31 Hours spent on homework	.287
42 Attitude toward studies	.339
43 Teacher's perception	.529
44 Grade expectations	.672
46 Scholastic and Vocational aspirations	-.337
47 Scholastic and Vocational aspirations	-.349
49 Scholastic and Vocational aspirations	-.364
51 Scholastic and Vocational aspirations	.249
52 Scholastic and Vocational aspirations	.619
54 Scholastic and Vocational aspirations	-.301
57 Scholastic and Vocational aspirations	-.336
59 Scholastic and Vocational aspirations	.261
60 Scholastic and Vocational aspirations	.604
61 Scholastic and Vocational aspirations	.229
62 Scholastic and Vocational aspirations	-.223
66 Science liked best	.320
67 Industrial arts liked best	-.371
68 Math most disliked	-.248
69 Business education most disliked	.243
70 Financial situations for post secondary education or training.	-.238
73 Financial situations for post secondary education or training.	-.338

STEP-WISE REGRESSION STUDY

The value of intelligence test scores as predictors of academic achievement has long been established. The value of other characteristics as predictors of academic performance depends upon the degree to which prediction can be improved by their inclusion in a regression equation with the intelligence test scores.

The next step in this research was to determine the predictive effectiveness of factor 2 and factor 3 by adding them to the verbal and non-verbal scores of the Lorge Thorndike and testing the significance of any increase in the prediction of the 11 criterion variables. The squared correlation coefficients and the probability of increase in the prediction of the 11 criterion variables are presented in Tables 5 - 15.

Criterion #1 (V: Vocabulary)

In Table 5 the regression system which included both the verbal scores plus non-verbal scores as predictors of Criterion #1 is found to be equal or superior to either verbal or non-verbal scores alone and was therefore used in determining the significance of the predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio was met by two models at the grade 9 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores.

Factor 3 scores account for 3% more of the variance of vocabulary scores when added to verbal plus non-verbal scores at the grade 9 level.

Factor 2 plus factor 3 scores account for 3% more of the variance when added to verbal plus non-verbal scores at the grade 9 level.

TABLE 5

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #1 (V: VOCABULARY) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.42		.63		.56	
V + 2	.42	.48	.63	.84	.56	.33
V + 3	.42	.36	.65	.08	.59	.01
V+2+3	.42	.45	.65	.20	.59	.03
N	.21		.38		.14	
N + 2	.21	.59	.38	.65	.16	.09
N + 3	.26	.00	.47	.00	.32	.00
N+2+3	.27	.01	.47	.00	.32	.00
V + N	.42		.63		.56	
V+N+2	.43	.44	.63	.94	.57	.34
V+N+3	.43	.41	.65	.08	.59	.01
V+N+2+3	.43	.46	.65	.20	.59	.04

Criterion #2 (R: Reading Comprehension)

In Table 6 the regresssion system which included both the verbal
and the non-verbal scores as predictors of Criterion #2 is found to
be superior to either verbal or non-verbal scores alone and was   there-
fore used in determining the significance of predictive increase by
the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio is
met by two models at the grade 7 level: verbal scores plus non-verbal
scores plus factor 3 scores and verbal scores plus non-verbal scores
plus factor 2 scores plus factor 3 scores. These same two models meet
the criterion at the grade 8 level. The verbal scores plus non-verbal
scores plus factor 3 scores meet the criterion at the grade nine level.

Factor 3 scores account for 1% more of the variance when added
to verbal plus non-verbal scores at the grade 7 level, 5% more of the
variance at the grade 8 level and 1% more at the grade 9 level.

Factor 2 plus factor 3 scores account for 2% more of the variance
of Reading Comprehension scores when added to verbal plus non-verbal
scores at the grade 7 level and 5% more of the variance at the grade 8
level.

Criterion #3 (L-1:   Spelling)

In Table 7, the regression systems which included both the verbal
and non-verbal scores as predictors of Criterion #3 were found to be
equal or superior to either verbal or non-verbal scores alone and
were therefore used in determining the significance of predictive in-
crease by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio was
met by one model at the grade 7 level: verbal scores plus non-verbal

TABLE 6

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #2 (R: READING COMPREHENSION) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.59		.55		.66	
V + 2	.60	.18	.56	.41	.66	.65
V + 3	.61	.01	.60	.01	.68	.01
V+2+3	.61	.02	.60	.02	.68	.03
N	.32		.39		.26	
N + 2	.33	.27	.39	.44	.28	.18
N + 3	.43	.00	.51	.00	.42	.00
N+2+3	.43	.00	.52	.00	.42	.00
V + N	.61		.56		.69	
V+N+2	.61	.21	.57	.61	.69	.70
V+N+3	.62	.01	.61	.01	.70	.02
V+N+2+3	.63	.03	.61	.02	.70	.07

TABLE 7

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #3 (L-1: SPELLING) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7 R^2	P	Grade 8 R^2	P	Grade 9 R^2	P
V	.37		.42		.43	
V + 2	.37	.95	.45	.05	.43	.81
V + 3	.39	.03	.45	.08	.43	.33
V+2+3	.39	.09	.46	.07	.43	.56
N	.15		.22		.16	
N + 2	.15	.95	.27	.04	.16	.56
N + 3	.24	.00	.32	.00	.24	.00
N+2+3	.25	.00	.33	.00	.24	.00
V + N	.37		.42		.44	
V+N+2	.37	.95	.46	.04	.44	.77
V+N+3	.39	.03	.45	.08	.45	.46
V+N+2+3	.39	.09	.47	.06	.45	.69

scores plus factor 3 scores. The criterion was met by verbal scores plus non-verbal scores plus factor 2 scores at the grade 8 level.

Factor 3 scores account for 2% more of the variance of spelling scores when added to verbal plus non-verbal scores at the grade 7 level.

Factor 2 scores account for 4% more of the variance when added to verbal plus non-verbal scores at the grade 8 level.

Criterion #4 (L-2: Capitalization)

In Table 8, the regression system which included both the verbal and non-verbal scores as predictors of Criterion #4 was found to be superior to either verbal or non-verbal scores alone and was therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio was met by two models in grade 8: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores.

Factor 3 scores account for 7% more of the variance of capitalization scores when added to verbal plus non-verbal scores at the grade 8 level.

Factor 2 plus factor 3 scores account for 8% more of the variance when added to verbal plus non-verbal scores at the grade 8 level.

Criterion #5 (L-3: Punctuation)

In Table 9, the regression system which included both the verbal and non-verbal scores as predictors of Criterion #5 was found to be superior to either verbal or non-verbal scores alone and was there-fore used in determining the significance of predictive increase by

TABLE 8

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #4 (L-3: PUNCTUATION) BY

THE INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.33		.26		.25	
V + 2	.35	.07	.30	.06	.28	.06
V + 3	.34	.45	.34	.01	.28	.03
V+2+3	.35	.18	.36	.01	.30	.03
N	.17		.27		.20	
N + 2	.18	.10	.30	.12	.23	.02
N + 3	.21	.01	.38	.00	.27	.00
N+2+3	.21	.01	.38	.00	.29	.00
V + N	.34		.31		.32	
V+N+2	.35	.08	.33	.15	.34	.06
V+N+3	.34	.50	.38	.01	.33	.08
V+N+2+3	.35	.20	.39	.02	.35	.06

TABLE 9

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #5 (L-3: PUNCTUATION) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.44		.39		.37	
V + 2	.44	.96	.40	.26	.37	.30
V + 3	.45	.06	.43	.03	.39	.07
V+2+3	.45	.17	.43	.09	.39	.15
N	.24		.45		.33	
N + 2	.24	.93	.45	.61	.35	.12
N + 3	.32	.00	.51	.01	.39	.00
N+2+3	.32	.00	.51	.02	.40	.00
V + N	.45		.49		.49	
V+N+2	.45	.96	.49	.72	.49	.32
V+N+3	.46	.08	.52	.03	.49	.20
V+N+2+3	.46	.20	.52	.08	.50	.33

the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio was met by one model at the grade 8 level: verbal scores plus non-verbal scores plus factor 3 scores.

Factor 3 scores account for 3% more the variance when added to verbal and non-verbal scores at the grade 8 level.

Criterion #6 (L-4: Usage)

In Table 10, the regression systems which included verbal scores plus non-verbal scores as predictors of Criterion #6 were found to be superior to either verbal or non-verbal scores alone and were therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio was not met by any model in the prediction of Criterion #6. Neither factor 2 scores, factor 3 scores, nor their combination accounted for a significant increase in the variance when added to verbal plus non-verbal scores in the prediction of Criterion #6.

Criterion #7 (W-1: Map Reading)

In Table 11, the regression system which included both the verbal and non-verbal scores as predictors of Criterion #7 was found to be superior to either verbal or non-verbal scores alone and were therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio is met by two models at the grade 8 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores. The criterion of .05 is

TABLE 10

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #6 (L-4: USAGE) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.53		.43		.23	
V + 2	.54	.45	.44	.37	.24	.61
V + 3	.53	.50	.46	.09	.25	.13
V+2+3	.54	.65	.46	.22	.25	.23
N	.36		.37		.25	
N + 2	.37	.54	.37	.52	.25	.89
N + 3	.40	.00	.43	.01	.29	.01
N+2+3	.40	.01	.43	.03	.29	.03
V + N	.57		.46		.34	
V+N+2	.57	.56	.47	.67	.34	.51
V+N+3	.57	.65	.49	.10	.34	.32
V+N+2+3	.57	.79	.49	.25	.35	.41

TABLE 11

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION # 7 (W-1: MAP READING) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; FACTOR 3)

Models	Grade 7 R^2	P	Grade 8 R^2	P	Grade 9 R^2	P
V	.35		.35		.18	
V + 2	.36	.10	.40	.03	.24	.01
V + 3	.36	.20	.41	.01	.25	.00
V+2+3	.37	.15	.43	.01	.29	.00
N	.29		.30		.21	
N + 2	.30	.14	.34	.05	.27	.00
N + 3	.33	.01	.41	.00	.31	.00
N+2+3	.33	.01	.42	.00	.34	.00
V + N	.40		.38		.27	
V+N+2	.41	.13	.41	.06	.32	.00
V+N+3	.41	.27	.44	.01	.32	.00
V+N+2+3	.41	.22	.45	.02	.36	.00

also met by all three models at the grade 9 level.

Factor 2 scores account for 5% more of the variance in Map Reading scores when added to verbal plus non-verbal scores at the grade 9 level.

Factor 3 socres account for 6% more of the variance at the grade 8 level and 5% more of the variance at the grade 9 level when added to verbal plus non-verbal scores.

Factor 2 plus factor 3 scores account for 7% more of the variance at the grade 8 level and 9% more of the variance at the grade 9 level when added to verbal plus non-verbal scores.

Criterion #8 (W-2: Reading Graphs and Tables).

In Table 12, the regression system which included both the verbal scores plus non-verbal scores as predictors of Criterion #8 was found to be superior to either verbal or non-verbal scores alone and was therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio is met by one model at the grade 7 level: verbal scores plus non-verbal scores plus factor 2 scores. The criterion is met by one model at the grade 8 level: verbal scores plus non-verbal scores plus factor 3 scores. The criterion is met by 2 models at the grade 9 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores.

Factor 2 scores account for 2% more of the variance in Reading Graphs and Tables scores when added to verbal plus non-verbal scores at the grade 7 level.

Factor 3 scores account for 4% more of the variance at the grade 8 level and 3% more of the variance at the grade 9 level when added to verbal plus non-verbal scores

TABLE 12

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #8 (W-2: READING GRAPHS & TABLES) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR; 3: FACTOR 3)

Models	Grade 7 R^2	P	Grade 8 R^2	P	Grade 9 R^2	P
V	.41		.31		.16	
V + 2	.43	.02	.33	.26	.17	.26
V + 3	.41	.72	.36	.04	.22	.00
V+2+3	.43	.06	.36	.11	.22	.01
N	.27		.31		.26	
N + 2	.29	.03	.32	.44	.27	.16
N + 3	.30	.02	.31	.01	.32	.00
N+2+3	.31	.01	.38	.03	.33	.00
V + N	.43		.36		.30	
V+N+2	.45	.02	.36	.53	.31	.27
V+N+3	.43	.85	.40	.05	.33	.01

Factor 2 plus factor 3 scores account for 3% more of the variance when added to verbal plus non-verbal scores at the grade 9 level.

Criterion #9 (W-3: Knowledge and Use of Reference Materials)

In Table 13, the regression system which included both the verbal scores plus non-verbal scores as predictors of Criterion #9 was found to be superior to either verbal or non-verbal scores alone and was therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio is met by one model at the grade 7 level: verbal scores plus non-verbal scores plus factor 2 scores. The criterion is met by two models at the grade 8 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores.

Factor 2 scores account for 1% more of the variance in Knowledge and Use of Reference Materials scores when added to verbal plus non-verbal scores at the grade 7 level.

Factor 3 scores account for 6% more of the variance when added to verbal plus non-verbal scores at the grade 8 level.

Factor 2 plus factor 3 scores account for 6% more of the variance when added to verbal plus non-verbal scores at the grade 8 level.

Criterion #10 (M-1: Arithmetic Concepts)

In Table 14, the regression system which included both the verbal scores plus non-verbal scores as predictors of Criterion #10 was found to be superior to either verbal or non-verbal scores alone and was therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

TABLE 13

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #9 (W-3: KNOWLEDGE & USE OF REFERENCE

MATERIALS) BY THE INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL

ALONE AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR; 3: FACTOR 3)

Models	Grade 7 R^2	P	Grade 8 R^2	P	Grade 9 R^2	P
V	.53		.42		.37	
V + 2	.55	.03	.44	.12	.37	.50
V + 3	.54	.22	.48	.01	.38	.19
V+2+3	.55	.07	.49	.02	.38	.38
N	.34		.38		.24	
N + 2	.35	.07	.39	.22	.25	.22
N + 3	.39	.00	.49	.00	.31	.00
N+2+3	.40	.00	.49	.00	.31	.01
V + N	.56		.46		.43	
V+N+2	.57	.04	.47	.28	.44	.54
V+N+3	.56	.29	.52	.01	.44	.38
V+N+2+3	.58	.10	.52	.02	.44	.62

TABLE 14

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #10 (M-1: ARITHMETIC CONCEPTS) BY THE

INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.46		.29		.32	
V + 2	.46	.42	.37	.01	.34	.06
V + 3	.47	.11	.35	.01	.35	.02
V+2+3	.47	.23	.40	.00	.36	.03
N	.35		.30		.18	
N + 2	.35	.50	.36	.01	.22	.02
N + 3	.40	.00	.39	.00	.28	.00
N+2+3	.40	.00	.42	.00	.29	.00
V + N	.51		.34		.36	
V+N+2	.51	.52	.39	.02	.38	.07
V+N+3	.52	.16	.40	.01	.38	.05
V+N+2+3	.52	.33	.43	.01	.39	.05

The criterion of .05 as the confidnece level of the F ratio is met by all three models at the grade 8 level. The criterion is also met by two models at the grade 9 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor 3 scores.

Factor 2 scores account for 5% more of the variance in Arithmetic Concept scores when added to verbal plus non-verbal scores at the grade 8 level.

Factor 3 scores account for 6% more of the variance at the grade 8 level and 2% more of the variance at the grade 9 level when added to verbal plus non-verbal scores

Factor 2 plus factor 3 scores account for 9% more of the variance at the grade 8 level and 3% more of the variance at the grade 9 level when added to verbal plus non-verbal scores.

Criterion #11 (M-2: Arithmetic Problem Solving)

In Table 15, the regression systems which included both the verbal scores plus non-verbal scores as predictors of Criterion #11 were found to be superior to either verbal or non-verbal scores alone and were therefore used in determining the significance of predictive increase by the addition of factor 2 and factor 3 scores.

The criterion of .05 as the confidence level of the F ratio is met by two models at the grade 8 level: verbal scores plus non-verbal scores plus factor 3 scores and verbal scores plus non-verbal scores plus factor 2 scores plus factor scores.

Factor 3 scores account for 7% more of the variance in Arithmetic Problem Solving scores when added to verbal and non-verbal scores at the grade 8 level.

TABLE 15

SQUARED CORRELATION COEFFICIENTS AND PROBABILITY OF INCREASE

IN THE PREDICTION OF CRITERION #11(M-2: ARITHMETIC PROBLEM SOLVING) BY

THE INTELLIGENCE TEST SCORES (V: VERBAL; N: NON-VERBAL) ALONE

AND INCLUDING THE BIOGRAPHICAL FACTOR SCORES (2: FACTOR 2; 3: FACTOR 3)

Models	Grade 7		Grade 8		Grade 9	
	R^2	P	R^2	P	R^2	P
V	.33		.22		.10	
V + 2	.33	.66	.24	.22	.11	.29
V + 3	.34	.33	.29	.01	.11	.19
V+2+3	.34	.60	.30	.04	.12	.31
N	.32		.20		.13	
N + 2	.32	.75	.21	.29	.14	.21
N + 3	.35	.02	.30	.00	.15	.08
N+2+3	.35	.08	.30	.01	.16	.15
V + N	.41		.24		.16	
V+N+2	.41	.81	.25	.35	.17	.31
V+N+3	.41	.46	.31	.01	.17	.35
V+N+2+3	.41	.76	.31	.04	.17	.45

Factor 2 plus factor 3 scores account for 7% more of the variance when added to verbal plus non-verbal scores at the grade 8 level.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this chapter a summary of the findings will first be presented followed by a list of the conclusions of the study and finally a list of recommendations for further research and use of biographical information blank.

Summary of Findings

Table 16 presents the summary of significant increases in R^2 when factor 2 scores and factor 3 scores are added to the verbal plus non-verbal scores of the Lorge-Thorndike in the prediction of the 11 criterion variables.

Factor 2 (Activities) adds significant predicting power to the verbal plus non-verbal scores in the prediction of 5 out of the 11 criterion variables. It adds power in the prediction of 2 criterion variables in grade 7, 2 criterion variables in grade 8 and 1 criterion variable in grade 9. The increase of variance accounted for by the addition of factor 2 ranges from 2% to 5%.

Factor 3 (Aspirations) adds significant predicting power to the verbal plus non-verbal scores in the prediction of 10 out of the 11 criterion variables. It adds power in the prediction of 2 criterion variables in grade 7, 8 criterion variables in grade 8 and 5 criterion variables in grade 9. The increase of variance accounted for by the addition of factor 3 ranges from 1% to 7%. Factor 3 is the more powerful predictor when compared to factor 2.

Factors 2 plus 3 add significant predicting power to the verbal

TABLE 16

SUMMARY OF SIGNIFICANT INCREASES IN R^2 OF BIOGRAPHICAL

FACTOR SCORES ADDED TO THE INTELLIGENCE TEST SCORES (V+N) IN THE

PREDICTION OF THE 11 CRITERION SCORES

| | Grade 7 | | | Grade 8 | | | Grade 9 | | |
| | Factors | | | Factors | | | Factors | | |
Criterion	2	3	2+3	2	3	2+3	2	3	2+3
#1 (V)								.03	.03
#2 (R)		.01	.02		.05	.05		.01	
#3 (L-1)		.02		.04					
#4 (L-2)					.07	.08			
#5 (L-3)					.03				
#6 (L-4)									
#7 (W-1)					.06	.07	.05	.05	.09
#8 (W-2)	.02				.04			.03	.03
#9 (W-3)	.01				.06	.06			
#10 (M-1)				.05	.06	.09		.02	.03
#11 (M-2)					.07	.07			

plus non-verbal scores in the prediction of 10 out of the 11 criterion variables. They add power in the prediction of 1 criterion variable in grade 7, 6 criterion variables in grade 8 and 4 criterion variables in grade 9. The increase of variance accounted for by the addition of factors 2 plus 3 range from 2% to 9%.

Conclusions

Three major conclusions were drawn from this study:

1. The results indicate that factor 2 (Activities) and factor 3 (Educational Aspirations) extracted from the biographical informa-tion blank and significantly to the predictive power of the Lorge Thorndike scores in the prediction of 10 out of 11 achievement criteria as measured by the Canadian Tests of Basic Skills ad-ministered to the students at Hillcrest junior-high school.

2. A biographical information blank can be scaled and scored to provide useful information for the prediction of academic achieve-ment.

3. Biographical information in prediction is the least effective in grade 7 as compared to grades 8 or 9 and is the most effective in grade 8 as compared to grade 7 or 9. The reason for this varia-tion is not known but such variables as pubertal changes, educa-tional status of the student and variations in the curriculum could be hypothesized as possible causes.

The research sample being limited to the junior-high school level and to one school, the generalizability of these conclusions depends upon the extent to which the sample is representative.

Recommendations

Three recommendations for further research were derived from this study:

1. Further research would be needed extending the sample to the high school level and to other schools to determine the generaliz-ability of this study's findings.

2. Because of the inconsistent results from grade to grade, the factor analysis study should be done by grade and by sex followed by a factor match. This procedure would then enable the researcher to isolate and properly deal with any grade or sex dependent content.

3. Further research using biographical information blanks should extensively cover the content areas contributing to the two factors isolated in this study, namely activities and educational aspira-tions.

Two recommendations are made for further use of the Pupil Inventory:

1. For predictive purposes, this blank should be abbreviated to use only those items contributing to the two factors.

2. The collection of data from this blank and their inclusion in pupils' permanent records may be helpful in guidance, clinical and other educational purposes.

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APPENDIX A

PUPIL INVENTORY

HILLCREST EDUCATIONAL INFORMATION

PROJECT

		M	F
Pupil's Name	Identification Number		Sex

Instructions for completing the Pupil Inventory

        This inventory is to be completed by all pupils. It is designed to
obtain information which will help us provide a better, more enjoyable junior
high school program. Read each question carefully and completely before
attempting to answer it. Select the best answer from among those given for
each question; that is, the answer which is true or most nearly true for you.
Then, place a check mark in the space which is opposite your selected answer.
This is not a test. The correct answer is the one you choose.

        Read the following sample question.

SAMPLE: How tall are you?   _____
        A. four feet eleven inches or shorter   _____
        B. between five feet and five feet five inches   _____
        C. between five feet six and five feet eleven inches   _____
        D. between six feet and six feet two inches   _____
        E. six feet three inches or taller   _____

        This is a sample of the kind of questions you will be asked to
answer. The sample item gives you a choice of answers to choose from.
If you are 5 feet 10 inches tall you would select the "C" answer and
place a check ( ) mark in the space to the right of the "C" answer,
as shown in the sample. Be sure to mark only one answer for each
question except for questions 3 and 5. In questions 3 and 5 we are
asking for information about your mother and father. Be sure to make
a check mark for each of your parents. The first column of spaces is
for the answer about your father, the second column is for answers
about your mother.

PUPIL INVENTORY

1. Which of the following statements best describes your
   parents? (Check one)
   A. They are married and living together
   B. My mother is not living
   C. My father is not living
   D. They are married but not living together
   E. They are divorced
   F. Neither of my parents is living
   G. I cannot answer this question

2. With whom are you now living; that is, who are the heads of
   the house in which you live? (Check one)
   A. Mother and father
   B. Mother only
   C. Father only
   D. Sometimes with my mother, sometimes with my father
   E. Mother and stepfather
   F. Father and stepmother
   G. Grandparents, aunt, uncle or cousins
   H. Brother or sister
   I. Foster parents (not relatives)
   J. None of the above

3. Which of the following statements best describes your
   parents occupations? (Make one check for each parent)
   (If either parent is not living or is not working for
   pay, please check what was his or her occupation).   Check for   Check fo
                                                          Father   Mother

   A. I cannot answer this question
   B. Farm worker, laborer, or a workman such as a
      janitor, railroad worker, construction worker,
      filling station attendant.
   C. Private household worker such as housewife, maid,
      butler, chauffeur
   D. Store clerk or salesman in a retail store or a
      typist
   E. Semi-skilled worker such as bus driver, factory
      machine operator, and meat cutter, or a protective
      worker such as a policeman
   F. Service worker or specially trained salesman like
      a barber, beautician, real estate salesman, mail
      carrier
   G. Skilled worker such as a carpenter, machinist,
      baker, foreman
   H. Technician such as a draftsman, dental technician,
      electronics technician, surveyor
   I. Manager such as a sales manager, factory supervisor
   J. Official such as bank officer or government official
   K. Proprietor or owner of a business, farm, restaurant
   L. Professional such as a teacher, medical doctor,
      lawyer, accountant

4. Which of the following best describes your mother's work at
    present?   _____
    A. Does not work for pay   _____
    B. Works 10 hours or less per week for pay   _____
    C. Works between 10 and 20 hours a week for pay   _____
    D. Works between 20 and 30 hours a week for pay   _____
    E. Works 30 to 40 hours a week for pay   _____
    F. Works 40 hours or more for pay   _____
    G. I can't answer this question   _____

5. Which of the following statements best describes the
    HIGHEST level of education attained by your parents, if
    either or both are not living, what was the highest level
    attained by them?   Check for   Check for
                                                      Father   Mother

    A. No formal schooling   _____   _____
    B. Some elementary school   _____   _____
    C. Completed elementary school   _____   _____
    D. Some high school   _____   _____
    E. Graduated from high school   _____   _____
    F. Some business, trade or technical school   _____   _____
    G. Graduated from business, trade or technical school _____   _____
    H. Some college (less than 2 years)   _____   _____
    I. Some college (2 years, but less than 4; enough for
        a teaching certificate, for example)   _____   _____
    J. Received the Bachelor's Degree (B.A., B.S., etc.,
        usually 4 years of college)   _____   _____
    K. Received the Master's Degree (M.A., M.S., etc.,
        usually 5 or 6 years of college)   _____   _____
    L. Received the Doctor's Degree (Ph.D., M.D., D.D.S.,
        etc., usually 7 or more years of college)   _____   _____
    M. I cannot say   _____   _____

6. On the average, during the school year, how many hours
    a week do you do work for which you are paid?
    (Allowance, food and clothing provided by parents are
    not considered pay).   _____
    A. None   _____
    B. 1 - 5   _____
    C. 6 - 10   _____
    D. 11 - 15   _____
    E. 16 - 20   _____
    F. 21 or more   _____

7. Which of the following statements best describes your physical
    health?   _____
    A. No physical handicaps or restrictions   _____
    B. Loss of, or restricted use of, arm or leg   _____
    C. Deafness in at least one ear or need for a hearing aid   _____
    D. Blindness in at least one eye   _____
    E. Asthma, diabetes or other permanent ailment (rheumatic
        fever, polio, epilepsy, congenital heart condition,
        cerebral palsy, etc.)   _____

8. On the average, how many hours each week do you spend doing
    homework outside of school?
    A. None
    B. 1 - 4
    C. 5 - 9
    D. 10 - 14
    E. 15 or more

    In your school, how active have you been in each of the
    following groups of activities last school year? Use the
    following rating scale to mark your answers to questions
    9 to 18.

    A   Very active (hold office, attend all meetings, hold major
        responsibility)
    B   Fairly active (attend most meetings, particpate in some
        major planning or activities)
    C   Participate little (attend some meetings only)
    D   Did not participate, but had opportunity to do so
    E   We do not have this activity in my school or I was not
        eligible
    F   I cannot answer this question

    PRINT ONE
    OF THE
    LETTERS
    A, B, C,
    ETC. IN
    EACH OF
    THE SPACES
    BELOW

9. Athletics (do not include required physical education classes).

10. Speech and dramatics (plays, debates, etc.).

11. Music (band, orchestra, choir, glee club; do not include required
    music classes).

12. Publications (yearbook, school newspaper, etc.; do not include
    work required for you by English or journalism courses).

13. Student government (student council).

14. Service clubs (Junior Chamber of Commerce, Y-Teens, and Key
    Club, etc.).

15. Honor Societies (do not include honor rolls).

16. Academic clubs (Latin, Science, Math., etc.; do not include
    required clubs formed within some language courses).

17. Hobby clubs or activities (photography, chess, etc.).

18. Social activities sponsored by the school (dances, parties, etc.).

19. How many unpleasant experiences have you had with other pupils
    in the school?
    A. A great many
    B. Quite a few
    C. Not very much
    D. Very few
    E. None

20. Which of the following best describes your general attitude
    toward studying? (Check your answer)
    A. I really like it
    B. I like it most of the time
    C. Can't say I like or dislike it
    D. I dislike it most of the time
    E. I dislike it very much

21. How do your teachers view you?
    A. As a top pupil
    B. A good pupil
    C. An average pupil
    D. A below-average pupil
    E. A very poor pupil

22. Next year you will probably get grades which are:
    A. Very low, maybe even failing a course or two
    B. Below average, but pass everything (C's)
    C. About average (B's)
    D. Somewhat above average (A's)
    E. Quite high (mostly A and H)

23. Suppose that the decision about your future education were
    entirely up to you, and you need only consider your own
    abilities and interests. Which of the following statements
    best describes the highest level of education you could attain?
    A. Something less than high school graduate
    B. High school graduation
    C. After high school graduate, work for a company that will
        train me on the job or send me to school at this expense
    D. Enter the military service after high school and get some
        training there
    E. Attend a technical, trade or business school which requires
        two years or less to complete
    F. Attend a technical, trade or business school which requires
        more than two years to complete
    G. Attend some college but not graduate
    H. Complete a junior college program
    I. College graduation (Bachelor's Degree)
    J. Something beyond a Bachelor's Degree such as a degree in law,
        medicine, dentistry, M.A. or Ph.D.

24. Realistically, considering not only your abilities and interests, but also your financial situation, your parents expectations, your family responsibilities, and what you want to do after high school, what is the elevelt of education you expect to attain?
    A. Something less than high school graduation
    B. High school graduation
    C. After high school graduate, work for a company that will train me on the job or send me to school at their expense
    D. Enter the military service after high school and get some training there
    E. Attend a technical, trade or business school which requires two years or less to complete
    F. Attend a technical, trade or business school which requires more than two years to complete
    G. Attend some college but not graduate
    H. Complete a junior college program
    I. College graduation (Bachelor's Degree)
    J. Something beyond a Bachelor's Degree such as a degree in law, medicine, dentistry, M.A. or Ph.D.

25. What is the main reason for the difference, if there was a difference, between your answers to the two preceding questions?
    A. I gave the same answer to both questions
    B. My parents want me to continue my education even though I don't think I could succeed
    C. My family cannot afford to give me as much education as I could attain
    D. Family responsibilities and problems (other than financial problems) will force me to limit my education
    E. I would rather get married or go to work than go on to the highest level I could attain
    F. I don't really want to continue beyond the level marked in the second question
    G. I expect to go into the armed forces

26. If you are a girl, answer this question. Boys do not answer this question.
    After you finish your schooling, what do you expect to do?
    A. Have a full-time career other than homemaker
    B. Have a full-time career for awhile, then combine homemaking with a career
    C. Have a full-time career for awhile, then a full-time homemaker
    D. Begin with, and maintain both a career and homemaking
    E. Be a full-time homemaker

27. Which of the following statements best describes the way your
    parents feel about the homework your teachers give you?
    A. To my best knowledge, my parents don't have any feelings
       one way or another on the subject
    B. They feel the teachers give too much homework
    C. They feel the teachers give about the right amount of
       homework
    D. They feel teachers give too little homework

28. Which one of the following groups of subjects do you like best?
    A. Mathematics (arithmetic, algebra, geometry, etc.)
    B. English (reading, speech, literature, rhetoric, etc.)
    C. Social Studies (geography, history, civics, etc.)
    D. Sciences (chemistry, biology, physics, etc.)
    E. Foreign Language (French, Spanish, German, etc)
    F. Music (band, chorus, etc.)
    G. Industrial arts and vocational subjects (homemaking, shop,
       mechanical drawing, agriculture, etc.)
    H. Art, drawing and crafts
    I. Business education
    J. Physical education

29. Which one of the following groups of subjects do you like the
    least?
    A. Mathematics (arithmetic, algebra, geometry, etc.)
    B. English (reading, speech, literature, rhetoric, etc.)
    C. Social Studies (geography, history, civics, etc.)
    D. Sciences (chemistry, biology, physics, etc.)
    E. Foreign Language (French, Spanish, German, etc.)
    F. Music (band, chorus, etc.)
    G. Industrial arts and vocational subjects (homemaking, shop,
       mechanical drawing, agriculture, etc.)
    H. Art, drawing and crafts
    I. Business education
    J. Physical education

30. Which of the following statements best describes how you plan
    to finance your education or training beyond high school?
    A. All finances will be taken care of by parents, scholarships,
       grants, savings or a trust fund
    B. I will have to work or borrow part of the money, with the
       remainder being provided by parents, scholarships, or other
       means
    C. I will have to borrow or work for all the money
    D. I don't know at this time how I will finance my education or
       training
    E. I don't plan to continue my education or training beyond
       high school

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